FINANCIAL INNOVATIONS AND MONETARY POLICY: A PRELIMINARY SURVEY*

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ABSTRACT

This paper provides a survey of ways in which financial innovations may affect the making of monetary policy. This subject has recently become more topical because of both the increased importance of monetary policy and the increasing pace of financial innovation.

The analysis makes use of the IS-LM framework. The discussion is by no means exhaustive or conclusive. However, it appears that in recent years there have been important factors which have altered the slope of the LM curve and others which have shifted it.

A steeper LM curve increases the effectiveness of monetary policy and vice versa. Two developments in recent years (the growth in the number and range of financial intermediaries and the increased volatility of interest rates) have reduced the slope of the LM curve and one (the payment of market-related interest rates to more forms of deposit) has increased the slope.

As regards the position of the LM curve, one could argue that the development of new transactions technologies would have reduced the demand for narrow money, shifting the relevant LM curve to the right. However, broader measures of money may not have been affected, or at least not to the same degree. Also, as innovation improves the efficiency of the whole financial system, the public might hold fewer financial assets for a given level of activity. This would also tend to shift the LM curve to the right.

Shifts in the slope and position of the LM curve complicate the task of using the money supply as an intermediate target. Redefinitions of the money supply might correct for shifts in the LM curve (if the magnitudes of the shifts could be predicted or estimated) but such redefinitions cannot allow for factors which have altered the slope of the LM curve. For this and other reasons, financial innovation strengthens the need to examine a range of financial variables in formulating monetary policy.

Introduction

Neither financial innovation nor analysis of its impact on monetary policy is unique to recent years. From the late 1950s, names like Gurley, Shaw, Minsky, Tobin and Brainard have been associated with research in this area. The basic point was stated many years ago:

> If financial institutions do not change significantly, then, once the efficacy of the various central bank operations is established, financial institutions can be ignored in discussions of monetary policy. However, if a period of rapid changes in the structure or in the mode of functioning of financial markets occurs, then the efficacy of central bank actions has to be re-examined. (Minsky, 1957, p.171)

In addition to the earlier work, much has been written recently by authors such as Donald Hester, Benjamin Friedman, Phillip Cagan, William Silber and economists from the Federal Reserve Board - e.g., Simpson and Porter.

There are several reasons to investigate this topic. The first reason is the apparently faster pace of financial innovation in the 1980s than previously. Second, monetary policy has been assigned a much more central role for economic stabilisation than in earlier decades; and third, we can hardly expect the rate of innovation to abate in the current climate.

Since the mid 1970s, the implications of financial innovation have been of mounting concern to the formulators of monetary policy in the U.S. Three related problems have appeared - greater short-run instability in the demand for money, a less reliable relation between M1 and economic activity, and slower growth in M1 than its historical relation with GDP would have suggested.[1]

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1. Charles Goodhart, of the Bank of England, might have anticipated this since, according to his rule-of-thumb, "any observed statistical regularity will tend to collapse once pressure is placed upon it for control purposes" (Goodhart, 1975, p. 5).

To some extent, Australia has avoided the American problems because most emphasis has been put on a relatively broad aggregate (M3) which is less affected by developments that shift balances between different types of bank deposits. In addition, the differences in institutional regulation mean that the Australian financial institutions are innovating around constraints different from their U.S. counterparts. For example, the U.S. legislation which imposed domestic taxation and Fed regulations on the international banking operations of American commercial banks induced banks to open offshore "brassplate" branches. In this fashion, some mobile transactions balances were kept out of required reports to the Fed (and IRS) and therefore out of M1 although they were available daily in domestic money markets. Finally, whereas the Reserve Bank of Australia releases volume of money figures monthly, the Fed's weekly announcements of the money supply have probably helped to increase public attention on the M1 figures, since policy was expected to react to each M1 outcome. As a result, further innovations were developed to exclude certain transactions balances from the M1 components reported to the Fed. These innovations, including repurchase agreements and sweep accounts, created elbow-room for financial institutions but exacerbated the slippage between M1 and the effective supply of transactions balances, so complicating the task of monetary control.

For these reasons, Australia should not be expected to experience the same innovations as America, nor such serious disruption to monetary relationships. However, with much more

change still to come in our financial sector, we should not ignore the opportunity to learn from the American experience and research.

It is also important to note that financial innovation has not been the only factor of change in the Australian financial system. Stages of official deregulation have probably had at least an equal impact on the nature and range of bank and non-bank functions. For example, the lifting of interest rate ceilings on certificates of deposit in September 1973 and the total deregulation of interest rates on deposits at banks in December 1980 encouraged Australian banks to compete actively for a deposit base and to consider liability management as well as asset management where the emphasis had previously been. If foreign banks begin to operate domestically under full banking licences, the shape of our financial system is likely to alter even more dramatically.

No doubt it should also be said that, while the implications of financial innovation for the efficacy of monetary policy might seem important, much greater policy shifts result from changes in government or prevailing economic thought.

Bearing in mind that there are other factors which influence the direction and capacity of monetary policy, this paper is concerned with examining some effects of financial innovation. In the next section the causes of innovation are briefly examined. Sections II and III use an IS-LM framework to show several ways in which innovations influence the impact of monetary policies. After treating a few additional problems of money definition and controllability, some conclusions are

ventured about what currently confronts Australian policymakers and how they might respond.

I

In attempting to explain the causes of innovation, not much advance has been made on Minsky who wrote that "changes in financial institutions and money-market usages are the result of either legislation or evolution" (Minsky, 1957, p. 171). The recent experience with high rates of inflation and interest (nominal and real), which has produced both a comprehension of the opportunity cost of holding transactions balances and an expectation that these high costs would continue, the growing sophistication of savers' demands and attitudes and the technological advances made in microcomputers and information transportation are all factors helping to explain financial innovations.[2] Briefly, financial institutions can be viewed as profit maximisers within constraints set by official regulation, available technology and the prevailing demands for services. In consequence, innovations will be forthcoming when either an external constraint is altered, or the cost of compliance (not innovating) becomes too great, or a profitable new service area lures.

II

Analysis of the consequences of financial innovation for the efficacy of monetary policy requires some framework, and in this study the familiar curves of macroeconomic equilibrium, IS and LM, will be employed. The limitations of

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2. For an interesting systematisation of these forces for change see Kane (1981). On the conflict between financial micro efficiency and macro stability see Mayer (1982).

these analytical tools are familiar and acknowledged. Their use means that dynamics of adjustment cannot easily be discussed. There is also the question of which definition of money to employ. Furthermore, one of the more obvious features of new financial instruments is their combination of transactions and investment qualities in a single asset. Such developments blur the traditional distinction between "money" and "bonds" on which the IS-LM framework rests. Nevertheless, by representing the repercussions of financial innovation in this way, some understanding of how monetary policy withstands financial change can be gained. The analysis looks first at factors which alter the slope of the LM curve, then at factors which cause the LM curve to shift.

The Slope of the LM Curve

Three aspects of financial innovation can be isolated which tend to alter the slope of either the money-demand or the money-supply function, and hence the slope of the LM curve. Before discussing these aspects it should be noted that a steeper LM curve will indicate more effective monetary policy in the sense of Davis and Lewis (1982, pp. 16-17).

Much of the early work in this area focussed on the growth in number and range of financial intermediaries and instruments, which was argued to have increased the interest elasticity of the demand for money[3] and thereby reduced the slope of the LM schedule. Monetary policy had become less effective, according to this reasoning, since balances were

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3. Or, as Abba Lerner phrased it, the elasticity of supply and of substitution for money of near-money had increased, but had not become infinite.

more readily transferred to near-money assets but central bank control over burgeoning non-bank deposit-taking institutions was weak.[4] Supporting the case for greater substitutability between money and other financial assets are the current high opportunity cost of holding excess balances in deposit forms which earn low or no interest and the technological advances made in banking. Improvements in processing associated with the microcomputer and electronic funds transfer have drastically reduced the costs in time and money incurred when transferring balances between assets.[5] Both M1 and M3 money-demand functions would be open to this effect.

The slope of the LM function would, on the other hand, tend to increase as innovations eventually bring the payment of market-related interest rates to more and more forms of deposit. In this case, money demand functions become more interest inelastic since yield differentials between assets will appear to remain constant with the whole structure of yields moving in response to market forces (a point made by Davis and Lewis (1982) in their consideration of the effectiveness of monetary policy in a deregulated world where banks could determine the interest rates to be paid on deposits in line with market yields). Again, M1 and M3 demand curves

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4. See, for example, Gurley and Shaw (1960), Cagan (1979) and Cagan and Schwartz (1975) on this topic. Marty (1961, pp.59-60) outlines a contrary case. Even earlier writers - Simons (1936) and Minsky (1957) - had discussed the structural instability produced by innovation.

5. Two examples are the availability of 24-hour automatic telling machines and cable-TV banking from home, both of which reduce the time costs of transacting. Working in the opposite direction to some extent are the recently introduced transactions taxes. For much more on new payments technologies see Marti and Zeilinger (1982).

could exhibit this impact, although this effect will probably be more important for M3.

The LM curve also depends on the money supply function. In the present climate of high levels and volatility of interest rates, the supply of money might become more sensitive to interest rates. With increased interest elasticity, the money-supply function becomes less steep; the slope of the LM schedule also declines, thus indicating diminished effectiveness of monetary policy. For example, a given expansion of the money supply produces, in the case of a flatter LM curve, a smaller drop in interest rates and a smaller increase in aggregate income than could have been achieved with a steeper LM schedule.

Thus, three disturbances to the slope of the LM function have been identified: two working to reduce the slope of the curve, the other to increase it. These effects appear to be applicable to functions based on both a narrow (M1) and a wider (M3) definition of money, although at present it is not possible to say what the combined impact of the three effects might be.

III

Shifts of the LM Curve

Some consequences of financial innovation act to shift the money-supply or money-demand curve (and therefore also the LM curve). First, the development of new transactions technologies has considerably reduced the demand for transactions balances. Moreover, since a greater range of financial "cross-products", offering some transactions and some investment services, is now available the volume of purely

transactions balances can be decreased, thereby reducing the demand for narrow money. This is the observation made by Cagan and Schwartz (1975) from their empirical work in an M1 context. All but transactions balances are transferred to higher-yielding assets outside M1. As a result, the demand function for M1 shifts to the left[6] and the corresponding LM schedule shifts to the right,[7] producing higher levels of income (for any given IS curve) and a higher velocity of circulation of money(M1).

As far as M3 is concerned, the picture becomes a little more complicated by a second effect. Provided that the present division in the payments system between banks and non-banks remains, then it could be argued that, in an accounting sense, funds will only disappear from M3 if they are put into government securities or are transferred overseas. Otherwise the money which shifts from M1 according to the first shift effect must find its way back into the banking aggregates, in which case an LM curve based on M3 would hardly shift at all. Consider, for example, funds which are removed from a bank term deposit to be placed with a building society, which in turn puts the funds into its cheque account with a trading bank. Although M1 increases, M3 is unaffected. What this means is that the growth of a range of close substitutes

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6. It also becomes steeper. When only the bare minimum necessary amount of transactions balances remains, the relevant demand curve should be vertical since the demand for transactions balances is presumed not to be interest-sensitive. A fourth influence on the slope of the corresponding LM curve can be discerned here.

7. Such an exodus could, of course, be stemmed if a market-related rate of interest were paid on current accounts.

for bank deposits need not lead to a fall in M3. However, despite this accounting constancy of the volume of M3, the velocity of M3 might be expected to rise due to the impact of innovations on the effective money supply. People could base spending decisions on the easy availability of the close substitutes for bank deposits (a form of liquidity) and so a higher level of income could be supported from a given base volume of money by encouraging spending in this manner.

The U.S. experience provides more direct evidence of the impact of financial innovations on the supply of money. New types of transactions media - for example, repurchase agreements (RPs), overnight Eurodollar deposits, sweep accounts and daylight overdrafts - have been designed precisely to provide intra-day funds and consequently to avoid the money-supply reports compiled at the end of the day. In these instances, the supply of M1 available for daily operating purposes is obviously greater than appears in the statistics or is subject to controls.

With these two points, a case begins to form that innovations act to oppose decreases in the supply of money. This factor might produce an outward shift of the money-supply function - at least an inward shift is resisted.

The third consequence to consider is this: it might also be the case in the longer term that, as successive innovations improve the operating efficiency of the whole financial system, the public will need to hold fewer financial assets to fund a constant level of productive activity. The resources freed from this function will be re-invested for the most rewarding purpose which need not necessarily be with

another financial institution. Therefore, we might expect that, as a behavioural response to a more efficient financial system, the size of the public's total portfolio of financial assets, and hence the demand for money, will decline, shifting the corresponding LM curve to the right.[8]

The combined effect of the three shift factors pushes the LM curve to the right, thereby working against monetary restraint. Furthermore, it is likely that, for any given increase of the IS curve, innovations enable the LM curve to move accommodatingly to minimise the increase in interest rates and maximise the change in income.

IV

Problems of Definition and Controllability

The upshot of disturbances to the shape and position of the LM function might be to weaken the case for using intermediate money-supply targets, in contrast with earlier decades when the LM schedule was thought to represent more stable and predictable behaviour than the real goods market behaviour behind the IS schedule. Such disturbances raise the thorny issues of what should be defined as "money" and what policy-makers should seek to control.

We observe that when policy presses to decrease the money supply, innovations arise to offset it. (Or on another plane, we could just as well speak of the decrease and increase of the rate of growth of the money supply.) Many economists

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8. In the U.S. context, this effect has also been suggested by Porter, Simpson and Mauskopf (1979). Over the last two decades in Australia, the velocities of M1, M2 and M3 have increased, but for a very broad definition of money - total borrowing by all financial institutions - the velocity has declined slightly.

regard this correspondence between monetary regulation or control and financial innovation to be almost as inevitable as mushrooms after rain.[9] Charles Kindleberger put it in the following way:

> My contention is that the process is endless: fix any M_i and the market will create new forms of money in periods of boom to get around the limit and create the necessity to fix a new variable M_j. (Kindleberger, 1978, p. 58)

In 1936, Henry Simons commented on the feasibility of controlling the quantity of currency and current deposits in a similar tone:

> The fixing of the quantity of circulating media might merely serve to increase the perverse variability in the amounts of "near moneys" and in the degree of their general acceptability just as the restrictions on the issue of bank notes presumably served to hasten the development of deposit (checking-account) banking. (Simons, 1936, p.5)

It becomes clear that when institutions or instruments are developed which "monetise" credit in new ways but are excluded from the definition of money, the quantity of money as defined might not grow although its velocity could rise. Therefore, in spite of the comforting "accounting" view that innovations will not disrupt monetary policy since almost everything has to end up in M3 again, we must be alert to the structural changes beyond our definition. Such changes displace the effective LM curve, alter velocity and disturb monetary control.

In response to such structural change a new variable M_j could be fixed, as Kindleberger suggests. New assets which act as very close substitutes for that which was previously defined as money might now be included in the

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9. Kane (1981) has suggested such a pattern and labelled it the regulatory dialectic.

monetary aggregate. In this way, M1 in the United States expanded to cover NOW accounts. Similarly, the U.K. authorities have adopted monetary redefinitions based on a characteristics approach rather than along institutional lines. Three characteristics highlighted in the U.K. exercise were term to maturity, size of deposit and purpose of the deposit. One might also want to consider the risk of default of the deposit-taking institution as a relevant characteristic although this last factor might complicate and reverse the aggregation and categorisation achieved under the first three characteristics.

However, the caveat relating to redefinition concerns the extent to which new institutions and instruments can be influenced by policy so that control over the total money supply is maintained. To begin with, as the definition of money widens to maintain stability in velocity, the strength and directness of control by the central bank over the aggregate declines. To counter this problem, it has been suggested that reserve requirements be imposed on all institutions offering close substitutes for money. So that further circumventive innovation is discouraged, market rates of interest should also be paid on both required reserves and demand deposits (see Cagan, 1979). Nevertheless, the costs of data collection, processing and time lags naturally increase as monetary aggregates encompass more institutions and instruments and ultimately this might begin to impair the effectiveness of policy. Some trade-off with coverage must be admitted.

Finally, it is pertinent to repeat that - according to the earlier discussion of the second factor altering the slope

of the LM curve - as more financial assets pay market-related rates of interest, the effectiveness of monetary policy diminishes. In other words, monetary redefinitions might correct for shifts in the LM curve if the shift factors could be predicted and estimated;[10] but the factors changing the slope of the LM schedule cannot be so reversed. Of M1 in the US, to take the most advanced example, David Lindsey argues that the development of interest-bearing current deposit forms "has made savings-oriented motives a more important influence on M1 demand than they have been in the past. Thus M1 demand in the future could respond differently to movements in economic variables than it has historically" (Lindsey, 1982, p.261; see also Morris, 1982, p. 11 n. 5). Therefore merely redefining money is an insufficient response to the impact of financial innovations.

V

Alternative Approaches

What options other than pure monetary targeting have been suggested for those who formulate monetary policy? Innovations shift and turn the LM schedule so that the conditions which have justified targeting the money supply tend to break down;[11] redefinition as an ex post correction neither precludes further disturbances to monetary aggregates nor ensures policy accuracy by restoring the former historical relation between GDP and money.

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10. An example is the likely boost to M1 in the U.S. during October 1982 when the issue of All Savers Certificates matures. We know from this case that estimation of the impact on money is virtually impossible.

11. For a wider discussion of these conditions see Friedman (1982).

One approach is to push ever harder on the segments still under direct monetary control so that, despite innovation and slippage, the desired end result is achieved. The second option involves widening the base for monetary policy, thus spreading the burden of regulation and control. Unfortunately, both these options involve the possibility of the financial system innovating further to evade control and restriction as long as the costs of being regulated remain high. The impact of policy measures will be diluted again. In the extreme, the pressure of control might render traditional monetary policy completely ineffective if liabilities of non-controlled institutions become acceptable as transactions balances, bypassing the bank payments system.

A third course of action would be to abandon monetary targeting.[12] For example, returning to a regime of interest rate targets has been proposed. In a world of high rates of inflation, however, the interest rate most relevant to activity levels is one of the expected real (after-tax) rates of interest, which would be unobservable. A current nominal rate - even a current real rate - is a poor substitute target.

Benjamin Friedman (1982), Jacob Cohen (1982) and Henry Kaufmann (cit. Morris, 1982, p. 8 n. 2) present the case for employing outstanding debt of the non-finance sector as the operating target of monetary policy. Basically their argument rests on an historical relation between non-financial economic activity and the aggregate outstanding indebtedness of all

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12. See "Discussion" following Lindsey (1982), Friedman (1982), Morris (1982) and Federal Reserve Bank of Boston (1980).

non-financial borrowers, a relation which is at least as stable and reliable as that between activity and any monetary aggregate. In addition, it is argued that this stability is manifest not only in the US economy, but also in Britain, Canada, Germany and Japan. The observed correlation, of course, proves nothing. Even if there were a causal influence from credit to GDP, it might be argued that Goodhart's law will again operate if a credit aggregate were to become the operational target of monetary policy.

Finally, explicit nominal GDP targets have also been proposed, for example by James Tobin and James Meade (cit. Morris, 1982, p. 8 n. 2). Apart from the difficulties in securing timely and reliable data and in directly controlling what is an ultimate aim of policy, it has been pointed out (by Albert Wojnilower, for example) that the announcement of a target for GDP comes perilously close to announcing an unemployment rate and this step could often be politically unacceptable.[13] The links from policy instruments to GDP are also far less clear than when money is the target variable.

Since each of these proposed alternatives carries significant negative aspects, perhaps the most sensible option is to follow a programme of internally consistent multiple targets. Within such a programme, credit, interest rates, money stock and other direct indicators of economic activity might play a role. This amounts to maintaining a broad bank of

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13. "Discussion" following Lindsey (1982), p.269. In this context, it was proposed that a two or three quarters moving average of nominal final sales could become the intermediate target.

economic information, minimising economic instability and the overreaction to an unforeseen disturbance in any one target, and tracking and reconciling divergent developments in the indicators.[14]

14. Advocates of this approach include Modigliani in "Discussion" following Lindsey (1982), Porter, Simpson and Mauskopf (1979), Friedman (1980, 1982).

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